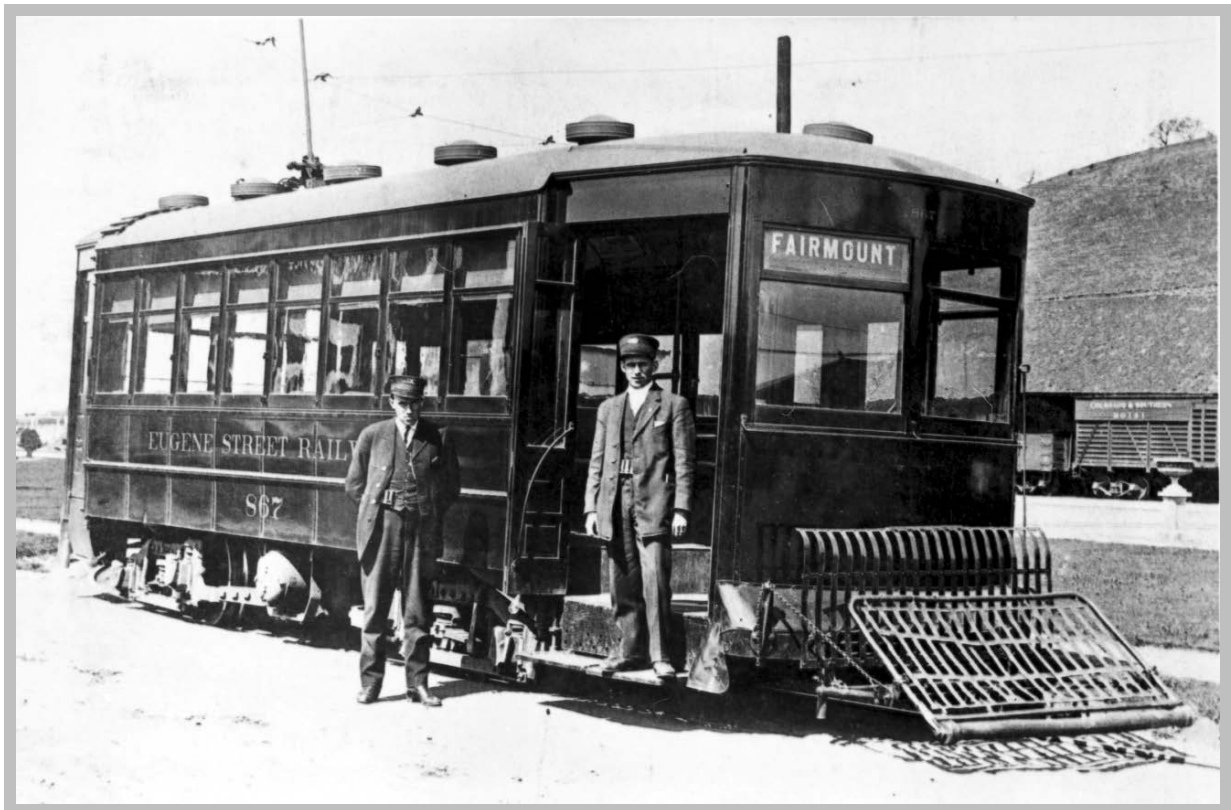


AN ARCHAEOLOGICAL ASSESSMENT OF
EUGENE STREET RAILWAY REMAINS
ON WILLAMETTE STREET,
EUGENE, LANE COUNTY, OREGON

Rick Minor



HERITAGE RESEARCH ASSOCIATES REPORT NO. 384

**AN ARCHAEOLOGICAL ASSESSMENT OF
EUGENE STREET RAILWAY REMAINS
ON WILLAMETTE STREET,
EUGENE, LANE COUNTY, OREGON**

by

Rick Minor

Submitted to

City of Eugene
Public Works/Engineering
99 E. Broadway, Suite 400
Eugene, OR 97401

Heritage Research Associates, Inc.
1997 Garden Avenue
Eugene, OR 97403

February 28, 2014

Heritage Research Associates Report No. 384

SHPO REPORTING DATA

Findings:	+
Site No.	35LA1590
County:	Lane
T/R/S	18S, 3W, Section 6
USGS quad:	Eugene, Oreg. 7.5'
Project Area:	1.3 acres
Area Monitored:	0.5 acres
Project Type:	Monitoring, Recovery, and Documentation
Report Title:	<i>An Archaeological Assessment of Urban Railway Remains on Willamette Street, Eugene, Lane County, Oregon.</i> Heritage Research Associates Report No. 384
Authors:	Rick Minor
Client:	City of Eugene (Public Works/Engineering)
Consultant:	Heritage Research Associates, Inc.
Permit No.:	AP-1818
Collections:	Report, fieldnotes, and photographs at Oregon State Museum of Anthropology, University of Oregon (Accession No. 2178). Samples of rails donated to Lane County Historical Museum. Additional rail samples and railroad artifacts may be donated to historic railroad museums in Oregon.

MANAGEMENT SUMMARY

An intact section of a historic urban railway was uncovered on Willamette Street between 19th Avenue and Grand View Drive during the City of Eugene's repaving project in 2013. As the tracks are more than 75 years old, they are considered an archaeological resource protected under Oregon State law, and work was briefly delayed while a State of Oregon Archaeological Permit was obtained. Upon issuance of this permit, work resumed with archaeologists monitoring the repaving project.

The section of historic urban railway uncovered is from the electric-powered streetcar or trolley system in operation in Eugene between September 26, 1907, and October 17, 1927. More specifically, this segment was part of the College Crest Line. Over the years this system was operated by three companies. It was referred to as the Eugene Street Railway by the Southern Pacific Railroad, which took it over on July 1, 1915, and thus operated the urban railway for the longest period, over 12 years. When Southern Pacific opted to discontinue operation of the urban railway in favor of motorized busses, the company removed track on some streets, but simply covered other sections with pavement.

Repaving of the west half of Willamette Street, which removed the west half of the railway track, was completed before monitoring by archaeologists began. Archaeological investigations were limited to recording observations made in conjunction with repaving of the east half of Willamette Street, during which the east rail of the track system was removed. Photographs of the railway remains were taken as they were exposed, and a sample of the rails and other railway components were recovered for analysis.

The 12 rail segments recovered for analysis bear dates of 1911, 1912, 1913, and 1920 and were obtained from the Illinois Steel Company, the Lorain Steel Company, the Inland Steel Company, and the Colorado Fuel & Iron Company. This sample indicates replacement of rails during upgrades to the track system as part of maintenance of the working streetcar line. Some of the rails and cobble pavers recovered were incorporated into an island in the intersection of 20th Avenue and Willamette Street as a reminder of the historic track system.

The remains of the historic urban railway uncovered in 2013 are a significant historical archaeological resource eligible for inclusion in the National Register of Historic Places. They have been recorded with the Oregon State Historic Preservation Office as historical archaeological site 35LA1590. Additional sections of the historic urban railway are likely to be encountered during future street construction. Preparation of a Treatment Plan and Programmatic Memorandum of Agreement (PMOA) are recommended to provide guidance to City of Eugene employees involved in street construction so that impacts to the remaining sections of the historic streetcar system may be avoided or minimized in the future.

PREFACE AND ACKNOWLEDGMENTS

The archaeological assessment of a historic Eugene Street Railway section presented in this report was conducted under the terms of a contract between the City of Eugene and Heritage Research Associates, Inc. (HERITAGE). Doug Singer, P.E., coordinated the project for the City of Eugene. Rick Minor, Ph.D., served as Principal Investigator for HERITAGE. This assessment was carried out in conjunction with the City of Eugene's 2013 Pavement Bond Measure Willamette Street: 19th Avenue to 23rd Avenue Project.

Field investigations, which mainly involved monitoring and photography during removal of the east portion of the railway section, were conducted under the terms of State of Oregon Archaeological Permit No. 1818. Fieldwork was carried out on September 16, 19, 24, 25, 27, and 30, and October 1–4, 2013. In addition to Rick Minor, HERITAGE archaeologists Linda P. Hart and Kevin C. McCornack assisted in the field during monitoring and documentation of the historic urban railway remains.

In addition to Doug Singer, City of Eugene personnel involved in the project included Lisa Jeffryes, Construction Lead, and Mike Koivula, Inspector. The cooperation of the city's contractor, Wildish Construction Company, and especially Foreman Dave Barrie, during this project is greatly appreciated.

Andrew J. Fisher, President of the City of Eugene's Historic Review Board, deserves special acknowledgement for his multiple contributions to this project. Together with Eugene construction contractor Marv Glover, Andrew took on the task of moving selected rail segments for temporary storage to his shop, where his knowledge and experience as a metalworker proved invaluable in the cleaning and cutting of rail segments and the identification of manufacturer's brands. In addition, Andrew generously made available excerpts about the urban railway that he had compiled from early Eugene newspapers for inclusion in this report. This project would have been far less successful without Andrew's involvement.

Railroad historian Gilbert Hulin, whose 1973 article "Eugene's Trolley Car Era" published in the *Lane County Historian* remains one of the principal sources of information on the Eugene's urban railways, visited the project area on September 19 while some of the railway segments were exposed and contributed insights based on his extensive knowledge. Cheryl Roffe, Collections Manager for the Lane County Historical Society, assisted in securing historical photographs of the urban railway in Eugene.

Selected segments of rails recovered from the historic urban railway on Willamette Street have been repurposed in new venues. The City of Eugene has used two rail segments, along with cobble pavers that flanked the rails, in an interpretive reconstruction of the historic urban railway at the intersection of 20th Avenue and Willamette Street. Four

short rail segments were donated by the City of Eugene to the Oregon Department of Transportation for future use in an interpretive exhibit on historic urban railways in Salem. Two more segments have been accepted for curation at the Lane County Historical Museum. With the documentation provided in this report, it is anticipated that additional rail segments recovered in the Willamette Street section will be distributed for curation at historic railroad museums in Oregon.

Illustrations pertaining to the historic urban railway used in this report were prepared by Kevin C. McCornack. Report production was undertaken by Linda P. Hart. Final responsibility for editing of this report was assumed by Kathryn Anne Toepel. Fieldnotes and photographs from this project are curated under Accession No. 2178 at the Oregon State Museum of Anthropology at the University of Oregon, Eugene.

Cover Photograph: Two crew members pose in the doorway of the Eugene Street Railway's Fairmount Boulevard streetcar (*Image GN4134 courtesy of the Lane County Historical Museum*)

TABLE OF CONTENTS

	<i>Page</i>
<i>Management Summary</i>	iii
<i>Preface and Acknowledgments</i>	iv
<i>List of Figures</i>	viii
<i>List of Tables</i>	x
 1. INTRODUCTION	 1
 2. EUGENE STREET RAILWAY	 5
Mule-Drawn Railway	5
Electric-Powered Railway	11
College Crest Line	12
End of the Eugene Street Railway	15
 3. FIELD INVESTIGATIONS	 17
 4. RAILWAY CONSTRUCTION AND MATERIALS	 23
Roadbed	23
Track Ballast	23
Cobble Pavement	24
Cross Ties	25
Rail Selection	26
Rail Joints	28
Track Bonding	29
Tie Plate	29
Track Spikes	33
 5. RAIL MANUFACTURERS' BRANDS	 34
Illinois Steel Company	35
Lorain Steel Company	37
Inland Steel Company	37
Colorado Fuel and Iron Company	37

TABLE OF CONTENTS (continued)

	<i>Page</i>
6. CONCLUSIONS AND RECOMMENDATIONS	39
New Information about Eugene's Urban Railway	39
Significance Evaluation.....	40
Recommendations	42
REFERENCES CITED	46

LIST OF FIGURES

<i>Figure</i>	<i>Page</i>
1. Location of the section of the historic Eugene Street Railway uncovered along Willamette Street in 2013	2
2. View north, showing rails from historic Eugene Street Railway exposed after removal of the topmost layer of pavement on Willamette Street	3
3. Remains of the Eugene Street Railway on the west side of Willamette Street near the intersection with 19th Avenue	4
4. Picture of the mule-drawn street railway which travelled Eugene's main street in the gay nineties	8
5. Wiley Griffon with the mule-drawn streetcar that he drove from Willamette Street to the University of Oregon, ca. 1893	8
6. The Eugene and College Hill Street Railway mule-drawn trolley routes	10
7. Map showing the route followed by the Eugene Street Railway College Crest Line	13
8. A Portland, Eugene & Eastern streetcar on the College Crest Line, ca. 1910	15
9. View southeast, showing ties from the Eugene Street Railway exposed in the saw-cut down the center of Willamette Street just south of Grand View Drive.....	18
10. View south, showing 3-foot, 6-inch length of east rail from the Eugene Street Railway College Crest Line exposed in the north location on Willamette Street at the intersection with 19th Avenue.....	18
11. View north, showing 12-foot, 2-inch length of east rail from the Eugene Street Railway College Crest Line exposed in the south location on Willamette Street at the intersection with 20th Avenue.....	19
12. View south, showing 12-foot, 8-inch length of east rail from the Eugene Street Railway College Crest Line exposed in the central location along Willamette Street between 19th and 20th avenues.....	20

LIST OF FIGURES (continued)

<i>Figure</i>	<i>Page</i>
13. Removal of one of eight 20-foot-long segments of rail recovered for use in interpretive projects	21
14. View southwest at the intersection of Willamette Street and 19th Avenue, showing uncovered east rail of the Eugene Street Railway College Crest Line and cobble pavers being loaded onto pallets for removal to the storage yard	22
15. Profile of stratigraphy around the east rail of the Eugene Street Railway College Crest Line on Willamette Street at 19th Avenue	24
16. Cobble pavers flanking the rails are visible in this photograph of an electric streetcar operated in Eugene	26
17. Views of the two halves of a continuous rail joint from the Illinois Steel Company	29
18. Cross sections of rails from Lorain Steel Company and Inland Steel Company shown in Figure 19	30
19. Side view of compromise joint connecting rail from Lorain Steel Company made in 1912 and rail from Inland Steel Company made in 1913	30
20. Examples of track bonding observed on rails include copper wire and copper strips	31
21. Single-shoulder tie plate used on the Eugene Street Railway	31
22. Along most of the Willamette Street section, tie plates were absent and spikes were nailed directly against the rail	32
23. Selection of spikes of different sizes represented on the Willamette Street section of the Eugene Street Railway	33
24. Rail segments in the warehouse undergoing examination for manufacturers' brands	34

LIST OF FIGURES (continued)

<i>Figure</i>	<i>Page</i>
25. Profiles of rails from manufacturers identified on the Willamette Street section of the College Crest Line	36
26. Rails and cobble pavers were used to commemorate Eugene's historic streetcar system at the intersection of 20th Avenue and Willamette Street	43

LIST OF TABLES

<i>Table</i>	<i>Page</i>
1. Timeline for Key Events in the History of Urban Railways in Eugene	6
2. Variation in Size and Weight of Cobble Pavers Used in the Willamette Street Section of the Eugene Street Railway College Crest Line	25
3. Rail Measurements Provided by the American Electric Railway Engineering Association and Measurements for Rails from the Willamette Street Section of Eugene Street Railway College Crest Line	27
4. Manufacturer's Brands Identified from the College Crest Line in Willamette Street	35

1. INTRODUCTION

One of the key developments in the history of the City of Eugene was the construction and operation of an urban railway system. Urban railways were introduced at the end of the nineteenth century, during a time when roads were unpaved and transportation was primarily by horse-drawn carriages and carts. The heyday of urban railways occurred in the first three decades of the twentieth century and coincided with the paving of streets, installation of street lighting, and construction for municipal water and sewer services, developments that together transformed the nature of urban life.

In Oregon, an urban railway powered by horses appeared as early as 1872 in Portland, connecting the business district along the west bank of the Willamette River to residential areas inland. This railway stimulated growth, and by the end of decade the west side of the river was connected by a network of horsecar lines (Labbe 1980:19). By 1889, horse-drawn streetcar lines were operating as a complement to steam train lines across the river in East Portland. With the completion of the first railroad bridge across the Willamette River in 1888, horse-drawn streetcar service was established connecting Portland and East Portland, and starting in November 1889 the upper deck of the bridge was used by the city's first electric streetcar or trolley line (Labbe 1980:20).

The development of an urban railway in Eugene followed a similar pattern, with operation of a mule-drawn streetcar line preceding the initiation of an electric-powered streetcar or trolley system. As in Portland, the street railway system in Eugene allowed people to reside in homes at increasing distances from the business district, spurring expansion in the city from its downtown core into new subdivisions like College Hill and the Fairmount neighborhood.

An intact section of the historic Eugene Street Railway's College Crest Line, buried during earlier street repairs, was uncovered during the City of Eugene's 2013 Pavement Bond Measure Willamette Street: 19th Avenue to 23rd Avenue Project, hereafter referred to as the City Repaving Project. This section of Willamette Street is located at the northeast foot of College Hill in T18S, R3W, Section 6 (Figure 1). The City Repaving Project involved replacement of deteriorated pavement over a total length of 1,700 feet, of which 640 feet required full reconstruction.

The presence of intact track from the Eugene Street Railway first came to light when the topmost layer of modern asphalt pavement was removed in the area between Grand View Drive and 23rd Avenue (Figure 2). The tracks for the historic urban railway extended more or less down the middle of Willamette Street. Intact track from the College Crest Line was found along the entire length of the City Repaving Project Area.

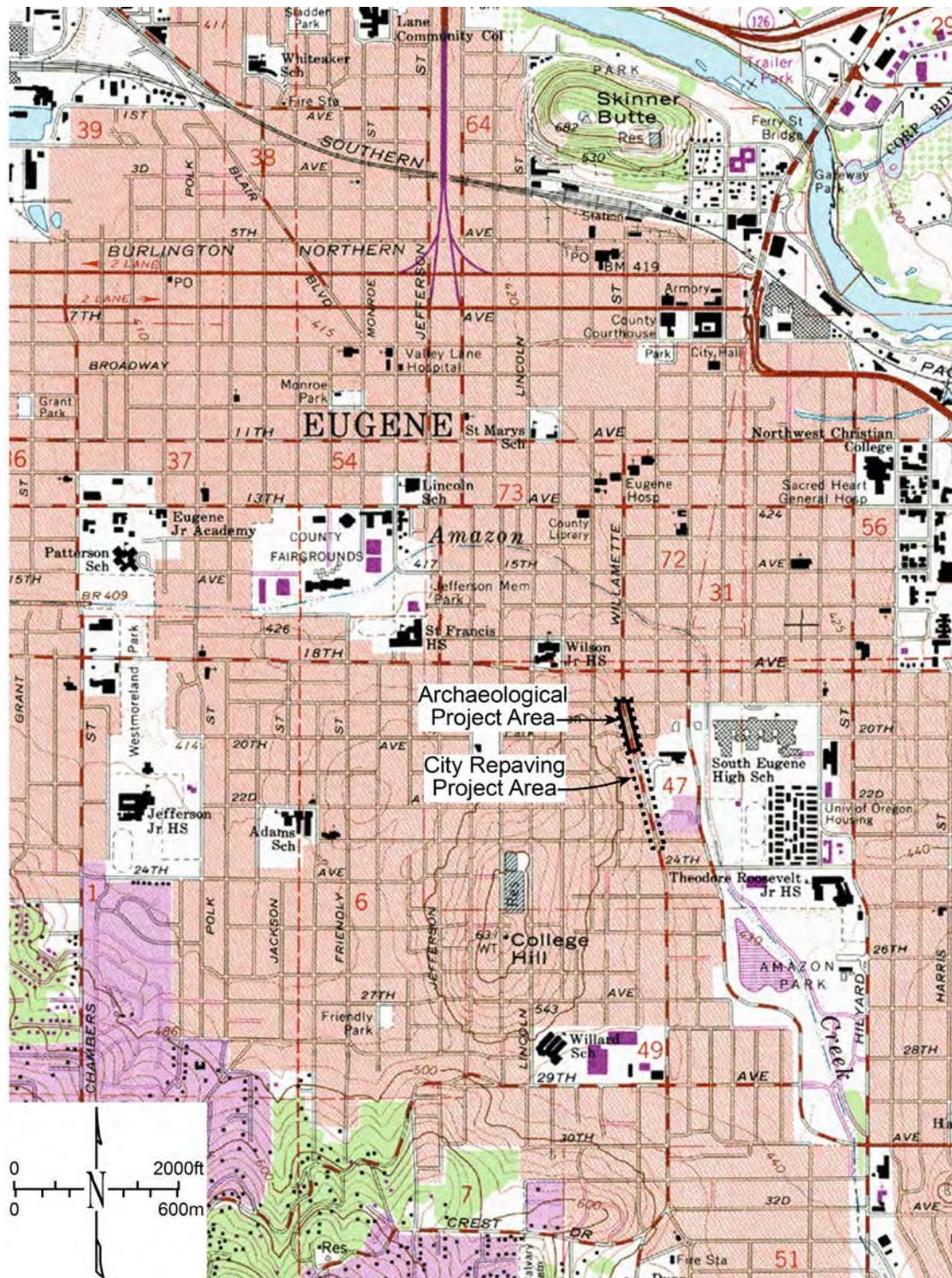


Figure 1. Location of the section of the historic Eugene Street Railway uncovered along Willamette Street in 2013 (Eugene East 7.5' USGS quadrangle, 1967, revised 1986).



Figure 2. View north, showing rails from historic Eugene Street Railway exposed after removal of the topmost layer of pavement on Willamette Street (photo by Andrew J. Fisher).

In preparation for the removal of pavement between 19th Avenue and Grand View Drive, a north–south saw-cut was made in the pavement down the center of Willamette Street. Situated roughly between the two rails, this saw-cut extended through the underlying wooden ties, in effect splitting the buried track system into east and west halves.

Excavations to remove existing pavement down to native soil then took place along the west side of Willamette Street between 19th Avenue and Grand View Drive. In the course of this work, the west rail, joint plates, spikes, and the western half of the supporting wooden ties were exposed and removed (Figure 3). With the removal of the west half of the track system, it became apparent that a remarkably intact portion of the former urban railway was preserved in Willamette Street.

The discovery of the remains of the historic urban railway on Willamette Street was brought to the attention of the Oregon State Historic Preservation Office. As the tracks are more than 75 years old, they are considered an archaeological resource protected under Oregon State law (ORS 358). Upon issuance of a State of Oregon Archaeological Permit, the repaving project proceeded with archaeologists monitoring the work, photographing the railway remains as they were exposed, and recovering samples of the rails and other railway components for public interpretation.

The remains of urban railways have been uncovered under streets in other cities in Oregon. In 2011, a section of historic railway track 98 feet in length was recorded during a waterline project on Bond Street in Astoria (Ragsdale 2011). In 2012, two sections of



Figure 3. Remains of the Eugene Street Railway on the west side of Willamette Street near the intersection with 19th Avenue (*City of Eugene photograph*).

historic railway track totaling approximately 200 feet in length were recorded during resurfacing at two intersections in Salem (Perrin et al. 2012). In both cases, recording of the historic railway remains was limited to field measurements, photographs, and background research. The tracks were subsequently removed with no further archaeological documentation or recovery.

Monitoring by archaeologists in conjunction with the paving project on Willamette Street resulted in acquisition of a substantially greater amount of information about the historic street railway system in Eugene. The presence of archaeologists during removal of the east half of the track permitted the recording of details of railway construction, as well as the recovery of samples of rails and other railway components that otherwise would have been lost. Together, observations made in the field, description and analysis of the recovered materials, and the results of archival research have combined to provide information about aspects of this historic urban railway that were previously unknown. Although limited to only one short section in Willamette Street, this study provides direction for management when portions of the historic Eugene Street Railway are uncovered in other areas of the city in the future.

2. EUGENE STREET RAILWAY

The history of urban railways in the City of Eugene is not well documented. The following historical background prepared for interpreting the remains of the Eugene Street Railway uncovered in Willamette Street relies primarily on two sources. The first comprehensive accounts of the historic railway were written by Marvin Tims, a long-time reporter for the *Eugene Register-Guard* (Tims 1957, 1964). A second important account is Gilbert Hulin's article "Eugene's Trolley Car Era" published in the *Lane County Historian* (Hulin 1973). A short video titled "Traveling Light: The Eugene Trolley Era," based on Hulin's article, is available on *YouTube* (Cooley 1996).

These sources of information about urban railways in Eugene are based on both contemporary and later newspaper accounts, the latter of which often include the recollections of individuals either employed by the railway companies or who remember riding on the streetcars. The history of the City of Eugene's street railway system can be divided into two phases, with the first phase employing mule-drawn cars and the second phase involving electric-powered cars (Table 1).

MULE-DRAWN RAILWAY

In April 1891, Henry W. Holden, from Fort Worth, Texas, received a franchise from the Eugene City Council to construct and operate a streetcar service in the city. He left for Chicago the next week to obtain rolling stock and the necessary materials for construction of the line. By May, Holden had returned to Eugene, reported that "his cars were being lettered," and that the new streetcar system would be named the "Eugene and College Hill Street Railway" (Tims 1964:4). An article in the May 23, 1891, edition of the *Eugene City Guard* reported that "a dozen men are busily engaged on Willamette street picking in hard gravel trenches for the resting places of the street railway ties."

The Eugene and College Hill Street Railway operated a system of mule-drawn streetcars along a primary route that ran from the Southern Pacific Depot south along Willamette Street to 11th Avenue, and then eastward along 11th Avenue to the University of Oregon (Tims 1964:4; Hulin 1973:3). Apparently even before operations began on this primary route, "Holden announced a branch line was being constructed out South Willamette to the vicinity of College Hill near what is now West 19th Avenue. The *Eugene Morning Register* said on June 24 that this line had been completed, bringing the total length of Eugene's railway system to about three miles" (Tims 1964:4).

Table 1. Timeline for Key Events in the History of Urban Railways in Eugene.

June 26, 1891	The Eugene and College Hill Street Railway owned by Henry W. Holden began operation with mule-drawn streetcars running from the Southern Pacific Depot south along Willamette Street and then (1) east along 11th Avenue to the University of Oregon, and (2) extending farther south along Willamette Street to 17th Avenue, and then west and south into today's Friendly Area Neighborhood.
September 1900	Holden sold the system to W. B. Dennis, who had to discontinue the operation in September because of a lack of business.
September 1900 to September 1907	No streetcar service in Eugene.
September 26, 1907	Railway system operated by the Eugene & Eastern Railway Company began running electric-powered streetcars from Southern Pacific Depot south along Willamette Street and then (1) east to the University of Oregon, and (2) west and south to the Friendly Street Neighborhood.
November 1907	The line to the university was extended south on University Street to the Masonic Cemetery.
December 27, 1907	The Eugene & Eastern Railway Company was sold to the Portland, Eugene & Eastern.
July 30, 1910	Service was initiated on the College Crest Line.
October 22, 1910	The electric line was extended east over a 600-foot span across the Willamette River to Springfield.
July 1, 1915	The Portland, Eugene & Eastern was bought out by Southern Pacific, which applied the name "Eugene Street Railway" to the system.
1915–1926	Southern Pacific operated four streetcar lines: the Fairmount Line, the College Crest Line, the Blair Blvd. Line, and the Springfield Line.
April 19, 1925	The Eugene City Council approved Southern Pacific's request to replace the electric streetcars with motorized buses.
Mid-1926	The Springfield Line was discontinued, and the streetcars were replaced by motorized buses.
October 17, 1927	The <i>Eugene City Guard</i> newspaper reported the last run of a streetcar on Willamette Street, bringing urban railway service in Eugene to an end.

Sources: Hulin (1973); Tims (1964)

As reported in the *Eugene Morning Register*, the streetcar company's first day of operation was June 26, 1891:

The Eugene street cars commenced carrying passengers on Friday for the first time. They carried passengers free the first day and were loaded down to the guards every trip, mostly with boys and girls. The next day they commenced business and had fewer passengers [Tims 1964:4].

A few months later, when the weather turned inclement, the new streetcar line encountered difficulties: “During the winter of 1891, Willamette Street, still unpaved, became so muddy that the car tracks began to settle. Crews spent several days repairing the track base so the rails would again be resting at the proper grade” (Tims 1964:4).

In 1892, Eugene’s new-fangled urban streetcar system came into some good-natured ribbing from the newspaper in a city to the south, as indicated by an account in the *Roseburg Review*:

Eugene has probably the most unique street car service in America. Whenever the cars are to make a trip, the proprietor advertises the fact several days ahead in the newspapers, probably so nobody will be left behind when the bell rings. He is a Texas man and his imported mule isn’t acclimated yet, so that his sickness during the rainy season causes business in that line to be at a standstill most of the time.... [Tims 1964:4–5].

In 1936, former driver Roy Sales recalled that at the time he was employed on the street railway around 1895, his passengers usually enjoyed the ride:

“But when it rained, my my. Such water and mud as there was down the center of Willamette street! Sometimes, just to be funny, some one would put out a sign, ‘ferry not running.’ They certainly used to make fun of us,” recounts Mr. Sales of those days when the mule-drawn car of the “Eugene street railway” would become stuck now and then as it bogged into a nice big mudhole [Lowry 1936].

Roy Sales also recalled that at the time he was driving the mule-cars (Figure 4), “there were eight mules employed by the company, managed by Harry and A. G. Holden, but built by their father. The mules were changed every four hours. During the period Mr. Sales was driver, the mules were Sam, Crickett, Molly, Dallas, Shave Tail, Belle, Dave, and Buck” (Lowry 1936).

In 1964, Pauline Walton, a 1904 graduate of the University of Oregon who was 85 years old at the time, recalled riding the mule-drawn streetcars many times as a child, and especially remembered Wiley Griffon, one of the streetcar drivers and one of the very few African-Americans in Eugene (Figure 5). Griffon apparently came from Texas with Henry W. Holden to work on the new street railway in Eugene (Tims 1964:4). Walton continued:

I remember that Wiley used to hitch his mule to a pole near Villard Hall on the campus when he didn’t have any passengers on board. Then he would go into the hall to see what was going on. Often, when he came back out, the car would be filled with passengers.

There were times when there were so many passengers that the poor mule couldn’t get the car started. Then the passengers had to get out and start pushing [Tims 1964:4].

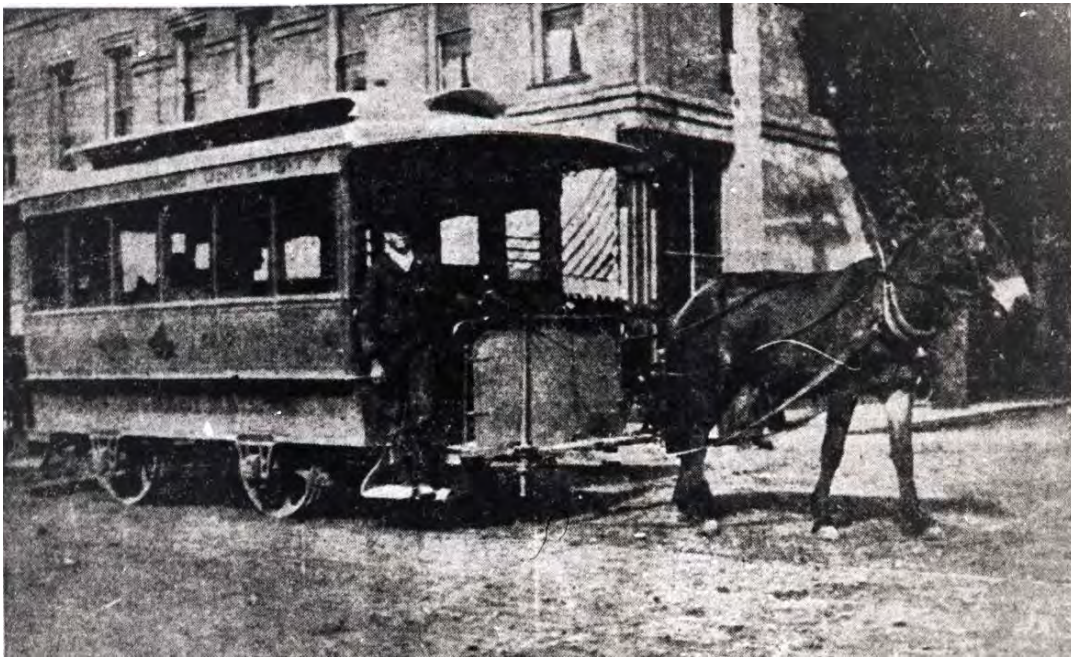


Figure 4. Picture of the mule-drawn street railway which travelled Eugene's main street in the gay nineties. This particular scene of Roy Sales, one of the "bus drivers," and Sam, one of the eight mules used at that time, was taken in 1895 at the corner of what is now Broadway and Willamette at the Hoffman hotel corner—note the nice, dusty street [caption from article by Marian Lowry in the *Eugene Register-Guard*, May 3, 1936] (Image GN4128 courtesy of the Lane County Historical Museum).



Figure 5. Wiley Griffon with the mule-drawn streetcar that he drove from Willamette Street to the University of Oregon, ca. 1893 (Image GN4127 courtesy of the Lane County Historical Museum).

In 1964, Lawrence Brown, another early Eugene resident, recalled “that the seats of the mule-drawn cars were reversible and were shifted each time a car reached the end of the line” (Tims 1964:5). Brown indicated that the two ends of the car were identical and explained, “When a car reached the end of the track, there was no need to have a turnaround. All the driver did was unhitch the mule, and walk him around to the other end of the car. Once the seats were reversed, the car was ready to go again” (Tims 1964:5).

The primary route of the Eugene and College Hill Street Railway provided service for passengers from the train station down Willamette Street before turning east along 11th Avenue to the university. The secondary route extended south along Willamette Street to 17th Avenue, then west along 17th Avenue into today’s Friendly Street Neighborhood. The reason for extending the line in this direction apparently lay in “Mr. Holden’s object to create a pleasure park on the slope of foothills which rise to the south of Eugene” (Hulin 1973:3–4). The route of the mule-drawn railway in South Eugene has been described as follows:

The route originated near the Southern Pacific Railway station near Willamette and 5th. From there it traveled south on Willamette to 17th, where it turned to the west for three blocks to Lincoln Street. The streetcar went down Lincoln to 22nd, where it again traveled west for four [actually three] blocks to Jefferson. It then turned north for one block to 21st where it then turned west a final time for about three blocks to Friendly Street. At the end of the line, the mule or horse was unhitched and moved to the other end of the car to begin the journey back downtown [Friendly Area Neighbors 2013].

The route of the mule-drawn railway, then, lay north and west of the section of Willamette Street between 19th and 23rd avenues where the tracks from the later Eugene Street Railway were uncovered in 2013 (Figure 6).

The Eugene and College Hill Street Railway operated for approximately nine years, from June 1891 to September 1900. The end of the line for the railway was summarized by *Eugene Register–Guard* reporter Marvin Tims as follows:

According to the late Randall V. Mills, University professor and historian, the mule line was operated by Holden until 1900. Holden then sold the system to W. B. Dennis, a Lane County miner. Dennis, however, had to discontinue the operation in September of that year because of a lack of business. He sold his cars to a Salem firm. Eugene was to be without street cars for the next seven years [Tims 1964:5].

A slightly different account of the disposition of the Eugene Street Railway’s property was given by Gilbert Hulin, who wrote that when the mule-drawn railway went out of business, the rails and equipment were purchased “early in 1903” by J. N. Dennis who shipped them for use at the Black Butte Mines (Hulin 1973:4–5).

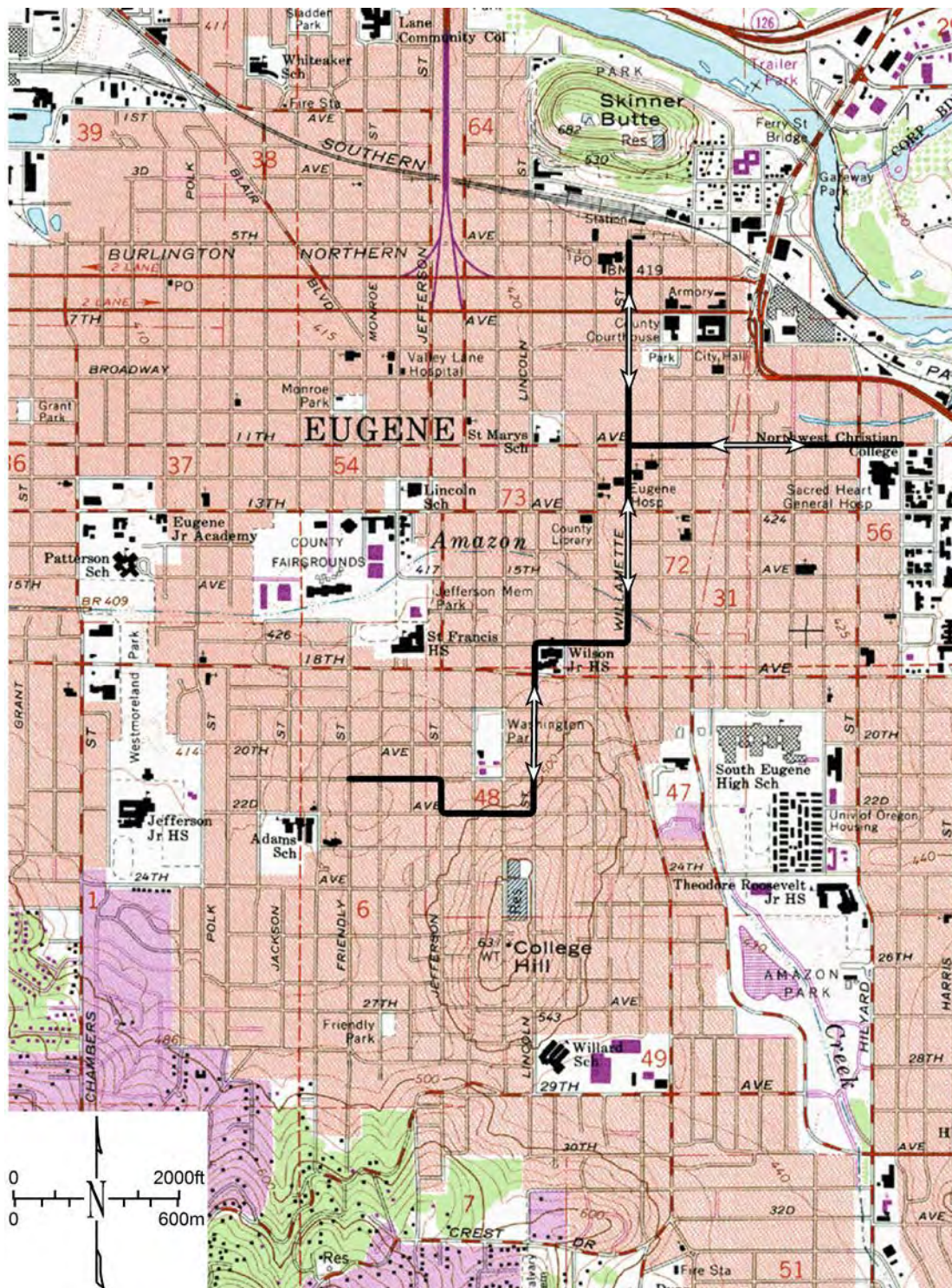


Figure 6. The Eugene and College Hill Street Railway mule-drawn trolley routes (1891–1900). Both extended from the Southern Pacific Depot down Willamette Street; then one headed east along 11th Avenue to the University of Oregon, and another continued south along Willamette Street to 17th Avenue, then west and south into today's Friendly Area Neighborhood (Eugene East 7.5' USGS quadrangle, 1967, revised 1986).

ELECTRIC-POWERED RAILWAY

In March, 1907, the city council awarded “Eugene’s first street paving contract to Warren Construction Co., calling for surfacing of Willamette street from the depot to Eleventh Avenue at a cost of \$24,754” (Hulin 1973:5). A short time later, a petition with 149 signatures was submitted to the city council on May 28 requesting that a franchise for an electric-powered railway be awarded to the Willamette Valley Company, headed by Alvadore Welch. After some amendments, the city council voted unanimously on July 10 in favor of the franchise “for the construction of a line from the S.P. depot to the southeast corner of the University campus on East Thirteenth Avenue to be completed by October 1, 1907” (Hulin 1973:5)

One source reported that “by April, 1907, work on paving Willamette Street was under way. Stone from Skinners Butte helped form the street’s base” (Tims 1957). Paving of Willamette Street did not come off without a hitch, however:

When crews started the excavation work on Willamette Street, they ran into hidden trouble. Old ties buried in the street in 1891 for the old mule-drawn streetcar line were difficult to remove. A large piece of equipment was damaged when the plough-like blade struck a tie. This delayed work for several days [Tims 1957].

Other sources indicate, however, that the work proceeded slowly and that there was some impatience within the community about the paving and railway construction projects (Hulin 1973:6). Apparently before the Willamette Valley Company began work on the railway, the Eugene & Eastern Railway Company was incorporated on May 11, 1907, and took over construction of the project (Hulin 1973:6–7):

Work on the trolley car system continued throughout the summer of 1907, with the *Register* reporting on August 27 that “three of the finest cars we can buy” had left Cleveland, Ohio, the week before for Eugene. And that week a 100 kilowatt dynamo arrived and was installed as a temporary power source behind the railway’s headquarters at 644 Willamette Street [Hulin 1973:7].

In September 1907, “four streetcars were delivered at this time from St. Louis. Each car cost about \$8,000 and could carry 100 passengers. Equipped with airbrakes, the cars were 45 feet long” (Tims 1957). The electric railway began operation on September 26, with the line running from the Southern Pacific Depot south on Willamette Street, then east along 11th Avenue to the University of Oregon (Hulin 1973:8). In November, the campus line was extended south on University Street to the Masonic Cemetery (Hulin 1973:8).

On December 27, 1907, the Eugene & Eastern Railway Company was sold to the Portland, Eugene & Eastern. With cars labeled PE&E during this time, the line was extended east across the 600-foot-long Southern Pacific Railroad bridge spanning the Willamette River to Springfield on October 22, 1910. By 1913, the Portland, Eugene & Eastern claimed 12.8 miles of track within the Eugene city limits and 2.36 miles from the

city limits to Springfield, bringing the railroad's total in the Eugene-Springfield area to 35.6 miles (Hulin 1973:11).

On July 1, 1915, the Portland, Eugene & Eastern was bought out by Southern Pacific, which applied the name "Eugene Street Railway" to the system (Hulin 1973:8). At its peak, the railway operated streetcars on four principal routes: (1) the Fairmount Line (an extension of the University/Masonic Cemetery Line), (2) the College Crest Line, (3) the Blair Blvd. Line, and (4) the Springfield Line (Hulin 1973:10–11).

In a 1973 interview in the *Register-Guard*, Warren Hastings recalled his employment on the Eugene Street Railway about 1919, when he was a student at the University of Oregon and also drove one of the streetcars in use at the time:

The five or six streetcars Hastings remembers had fixed, hourly stops on their routes, and were equipped with double rattan seats running down both sides of the trolley, as on buses today.

Each car was equipped with two "trolley poles" which powered the vehicles from overhead wires. Each time the car reached one or the other ends of its line, the motorman was required to get out, pull down the trolley pole which had powered it going in that direction, and put the other one in place.

Also, since the car itself did not turn around at the end of the line (like, for instance, San Francisco cablecars) the motorman had to reverse the backs on all the seats so they were facing in the proper direction.

Hastings said there were 14 motormen on the payroll when he was operating trolleys, and he placed the carbarn about where Friendly Hall is now on the University of Oregon campus.

...The trolleys ran on "standard gauge tracks," which were four feet, eight and a half inches wide. Voltage in the trolley poles was about "500 volts DC." He does not remember the location of the power plant [O'Brien 1973].

COLLEGE CREST LINE

The College Crest Line was a loop that encompassed the county fairgrounds and College Hill area (Figure 7) in what was then southwest Eugene (Hulin 1973:10). The route was described in considerable detail in the article "Transportation to College Crest in 1918" by Roger Houglum, which was published in the Fall 1988 *Lane County Historian*:

There was a well-established street railway system in Eugene, and one of its largest 'loops' was the College Crest Line that served much of Southwest Eugene....

Starting from 11th and Willamette, the line swung west on 11th to Polk where it turned south to 18th Avenue. Then up 18th Avenue (east) to Jefferson to 24th (south); then west to Friendly Avenue. Turning south on Friendly, it continued to

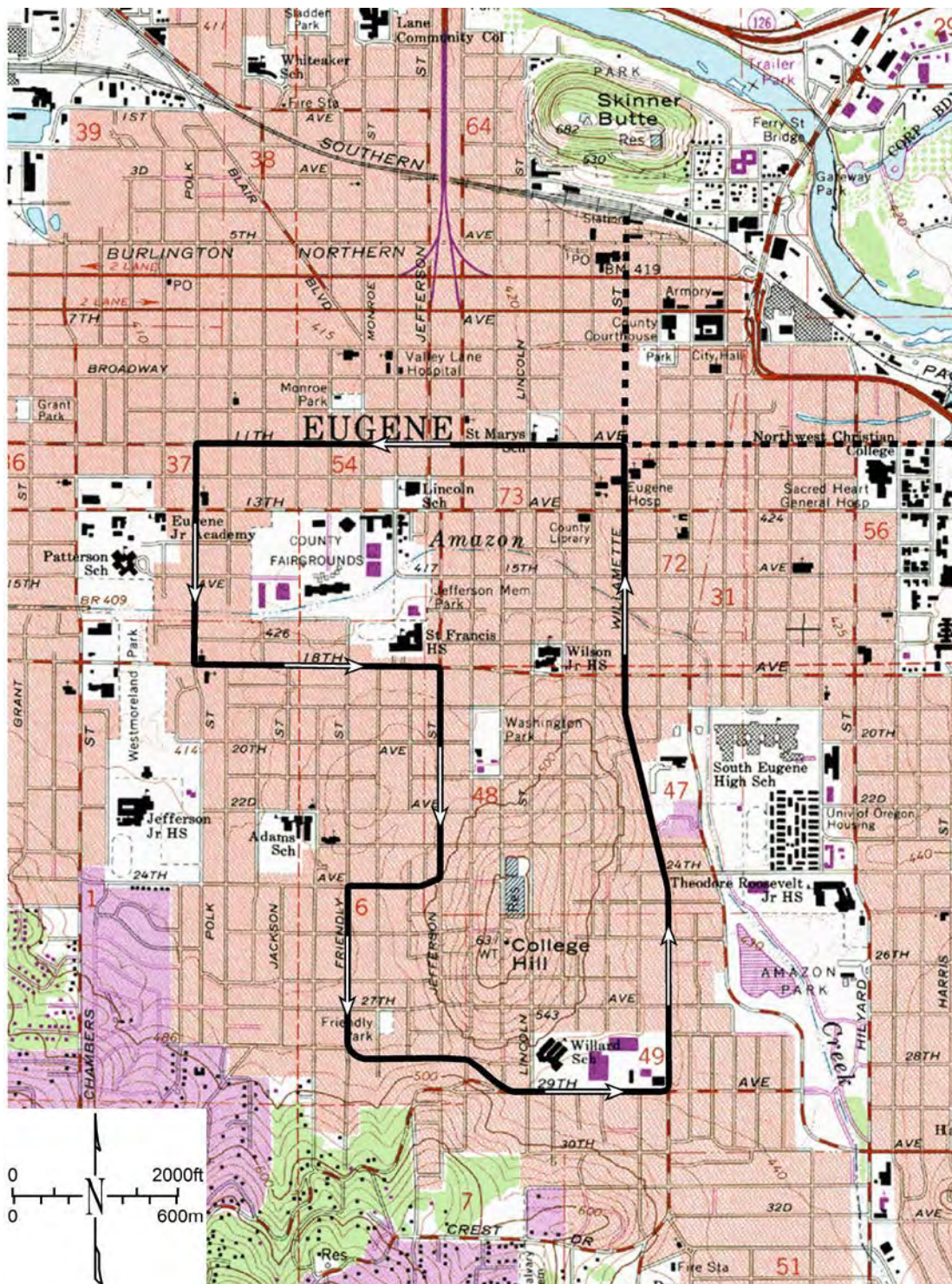


Figure 7. Map showing the route followed by the Eugene Street Railway College Crest Line (1910–1927). At the intersection of 11th Avenue and Willamette Street, the College Crest Line extended westward off the route from the train station to the university in a loop that encompassed the county fairgrounds and College Hill area in what was then southwest Eugene (Eugene East 7.5' USGS quadrangle, 1967, revised 1986).

28th and Friendly, the location of the College Crest Station. Thence east over what is now 28th Avenue and over the low divide between College Hill and the higher ground to the south. Arcadia Station was at the present intersection of 28th and Madison; Sunset Station was located at the intersection of 28th and Jefferson. From Sunset Station the line veered southeastward toward its intersection with Wood Avenue, now 29th Avenue, and continued east to 29th and Willamette; the location of Orswell Station. At 29th and Willamette, the line turned north on Willamette which it then followed to the intersection of 11th and Willamette, completing the loop.

There was half-hour service on the line between the hour of 6:00 AM and midnight, 7 days a week; and the fare was 5¢ for those riders under 12 years of age, 10¢ for all others. The electrically heated cars had straw-upholstered seats, and could accommodate up to 35 to 40 passengers [Houghlum 1988:63].

The route extended into areas of south Eugene that had not yet been developed. The only known photograph of a streetcar on the College Crest Line shows rolling hills in the background (Figure 8).

A special edition of the *Eugene Daily Guard* on July 31, 1910, ran with the headline “Service Over New Railway Loop Has Begun—Twelve Hundred Passengers Carried on Line Sunday—Half-hour Service Now.”

Street car service on the new College Hill loop was inaugurated yesterday. Only one car was run and that not until late in the morning, yet, just 1200 people made the circuit around the southern part of the city. Hereafter the car will be run on regular half-hour schedule. The first car will leave the depot at 6:30 a.m. and they will run every half hour thereafter until 10 p.m. The fare around the loop is ten cents, but transfers are issued for the first fare from any other line or to any other part of the city.

The College Crest Line was not in service very long before improvements were proposed. The *Eugene Daily Guard* reported in its June 18, 1912, edition that “it is the intention of the company (PE&E) to reconstruct the College Hill and Fairmount lines in order to use large, comfortable cars on all parts of the system...”

Reconstruction of the railway was proposed despite the fact that much of Willamette Street had been paved that year. An advertisement in the *Eugene Daily Guard* on January 1, 1913, indicated that paving of Willamette Street from 13th to “Hospital Road” had been contracted for or was under construction by the Clark & Henery Construction Company during the previous year.

Under the headline “Will Lay Heavy Steel on South Willamette Street,” the *Eugene Daily Guard* on January 2, 1913, reported that “the Portland, Eugene & Eastern will shortly commence the laying of the heavy steel they have on hand for street railway work on South Willamette street. The laying of the steel on West Eleventh is now almost finished and when the crew is done there this work will be taken up.”



Figure 8. A Portland, Eugene & Eastern streetcar on the College Crest Line, ca. 1910. This scene shows the streetcar and passengers parked in a grassy field, with the rolling hills of south Eugene in the background (*Image GN4122 courtesy of the Lane County Historical Museum*).

END OF THE EUGENE STREET RAILWAY

The Eugene Street Railway apparently was never very profitable. The Springfield Line was discontinued by mid-1926, when the streetcars were replaced by motor vehicles (Hulin 1973:11, 14). Busses were considered to have advantages over streetcars in causing less traffic congestion, less damage to street pavement, and in allowing “unsightly trolley wires” to be removed (Hulin 1973:14).

On April 18, 1927, Southern Pacific submitted a request to the Eugene City Council to substitute buses for streetcars, and the request was approved the next day (Hulin 1973:11, 14). On October 17, 1927, the *Eugene Daily Guard* reported that “a lone and strangely interesting street car creaked and groaned north on Willamette Street at 8:30 o’clock Monday morning. It was significantly a reminder that trolley cars are no more in Eugene” (Hulin 1973:15).

The assets of the Eugene Streetcar Company were purchased by the Southern Pacific Motor Transport Corporation in 1927 (Tims 1964:6). Southern Pacific acted quickly to tear out the existing track, beginning on some sections while the railway was still in operation on others. On September 18, 1927, the *Eugene Morning Register* reported that

“Streetcar rails on University between Fifteenth and Eighteenth have been removed and the three blocks graded” (Hulin 1973:15). A month later, on October 21, 1927, an article in the *Eugene Morning Register* reported:

With streetcar lines permanently discontinued, work has already started on the removal of tracks on unpaved streets.... A large crew has been put to work on track removal. The long stretches of unpaved track in College Crest and Fairmount are being taken up first. Workmen will start tearing down trolley lines and poles in about ten days. No decision has been made yet on the disposal of the old car barns at East 13th Avenue and Beech Street [Tims 1964:6].

Southern Pacific originally may have planned to remove all of the railway track, but “SP officials told the Eugene City Council their firm would cover much of the track with asphalt pavement, and in a few cases, leave the track in place. It did” (Tims 1964:6). One of the sections where the track was left extends along Willamette Street. It was a portion of this section that was uncovered during the City of Eugene’s pavement project between 19th and 23rd avenues in 2013.

3. FIELD INVESTIGATIONS

The City Repaving Project began with removal of the topmost layer of modern pavement between Grand View Drive and 23rd Avenue during which time the tops of rails from the urban railway were exposed in Willamette Street. Next a north–south saw-cut was made down the center of Willamette between 19th Avenue and Grand View Drive that divided the street into east and west halves. As the urban railway track extended down the middle of the street, the saw sliced through the ties roughly midway between the rails.

Removal of existing pavement down to native soil was then undertaken along the west side of Willamette Street. In the course of this work, the west portion of the street railway track was removed. This excavation also exposed a segment of 4-inch-diameter terra-cotta pipe that was apparently a portion of the waterline installed in 1914 to serve the expanding College Hill neighborhood. Removal of the pavement down to native soil left the remains of ties exposed in the face of the cut down the center of the street (Figure 9).

It was not until the paving project shifted to the east side of Willamette Street that archaeologists became involved in the repaving project. Before any further repaving excavations were conducted, the City and its repaving contractor exposed intact sections of rail, cobble pavers, and concrete for examination by the archaeologists. Archaeological fieldwork often involves sampling at different locations to insure that the range of cultural materials is documented. With this in mind, these intact sections were inspected, measured, and photographed at three separate locations along Willamette Street.

The north location, near south side of the intersection of 19th Avenue and Willamette Street, provided the shortest exposure, measuring 3 feet, 6 inches long (Figure 10). Six cobble pavers set perpendicular to the rail in a single row were observed on the west side of the rail. Most of the cobble pavers on the east side were no longer present, having been detached when the overlying pavement was removed.

The rail exposure in the south location, near the south side of the intersection of 20th Avenue and Willamette Street, measured 12 feet, 2 inches long. A single row of cobble pavers was set perpendicular to each side of the rail. Thirty-two cobble pavers remained in place along the east side of the rail. Twenty-six cobble pavers were visible along the west side of the rail. Additional cobble pavers were obscured by asphalt (Figure 11).

In the central location, which began approximately 100 feet north of the intersection of 20th Avenue and Willamette Street, the exposure of rail measured 12 feet, 8 inches long (Figure 12). This exposure provided the best view of the original appearance of rail,



Figure 9. View southeast, showing ties from the Eugene Street Railway exposed in the saw-cut down the center of Willamette Street just south of Grand View Drive.



Figure 10. View south, showing 3-foot, 6-inch length of the east rail from the Eugene Street Railway College Crest Line exposed in the north location on Willamette Street at the intersection with 19th Avenue.



Figure 11. View north, showing 12-foot, 2-inch length of the east rail from the Eugene Street Railway College Crest Line exposed in the south location on Willamette Street at the intersection with 20th Avenue.



Figure 12. View south, showing 12-foot, 8-inch length of the east rail from the Eugene Street Railway College Crest Line exposed in the central location on Willamette Street between 19th and 20th avenues.



Figure 13. Removal of one of eight 20-foot-long segments of rail recovered for use in interpretive projects.

cobble pavers, and concrete along this section of Willamette Street. As in the other two locations, a single row of cobble pavers was set perpendicular to each side of the rail. Thirty-four cobble pavers were observed in place along the east side of the rail and 33 were observed along the west side.

The intact section from the east rail of the Eugene Street Railway—including associated ties, cobble pavers, and concrete—was first uncovered at the intersection with 19th Avenue. With the cooperation of the city’s paving contractor, care was taken in removing existing pavement from around the intact section of rail. The practice employed in the west half of Willamette Street of bending and snapping the rails during removal was discontinued temporarily. Leaving segments of track in place allowed details of railway construction to be photographed and documented. Several straight 20-foot lengths of rail were then recovered for interpretive exhibits (Figure 13). In addition, care was taken to minimize damage to the cobble pavers through use of a hydraulic hammer during their removal. The cobble pavers were collected on pallets and transported to city’s storage yard for potential use in future interpretive exhibits and landscape projects (Figure 14).



Figure 14. View southwest at the intersection of Willamette Street and 19th Avenue, showing uncovered east rail of the Eugene Street Railway College Crest Line and cobble pavers being loaded onto pallets for removal to the storage yard.

Segments of the east rail from the Eugene Street Railway removed during the paving project were temporarily stored near Civic Stadium. A systematic inspection of these rails for manufacturers' brands (embossed letters and numbers), which were usually obscured by concrete, was planned once all existing pavement and railway remains had been removed in the paving project area. Unfortunately, the bent rail segments had been placed in a large pile which, because of the considerable weight of the segments and instability of the pile, precluded systematic inspection.

With the cooperation of the city's paving contractor, a mechanical excavator was used to sort through the pile of bent rails to extract and set aside a sample of rails exhibiting manufacturer's brands. This sample of 12 bent rail segments was removed to a private warehouse for closer examination. The remaining bent rails were transported to a recycler by the contractor. Eight 20-foot-long straight rail segments set aside for possible interpretive projects in the future were later transported to the City of Eugene's storage facility.

4. RAILWAY CONSTRUCTION AND MATERIALS

Albert S. Richey's *Electric Railway Handbook: A Reference Book of Practice Data, Formulas and Tables for the Use of Operators, Engineers and Students*, published in 1924, provides an encyclopedic baseline of information about the construction of electric railways during the same period in which the Eugene Street Railway was in operation. This book is thus relied on heavily in the following description of the methods and materials used in the construction of the section of the Eugene Street Railway uncovered on Willamette Street.

ROADBED

Electric urban railways installed in city streets required special consideration in terms of roadbed construction:

The construction of roadbed in highways must necessarily differ materially from construction on private right of way, and as the conditions as to subsoil, highway traffic, pavement, etc., vary so widely, it is not possible to standardize such construction to so great an extent as has been done in the case of the private right-of-way roadbed. A careful study is necessary with respect to the bearing value of the soil in the street, and upon this will depend not only the character and depth of ballast, but whether or not some form of concrete foundation is desirable [Richey 1924:29–30].

The sequence of methods and materials used in constructing this section of the Eugene Street Railway is illustrated in a sketch of the stratigraphy exposed during removal of the east rail (Figure 15).

TRACK BALLAST

Track ballast is the material that forms the roadbed upon which railroad ties are laid. It is packed below, between, and around the ties. Richey noted that “in selecting ballast the first consideration should be to obtain a material as free from clay and loam as possible, in order to afford an opportunity for water to drain off rapidly. Crushed stone possesses most of the qualities of an ideal ballast...” (Richey 1924:25). The Willamette Street section was constructed on a 6-inch-thick deposit of ballast consisting of angular crushed basalt, usually described as 1-inch open rock. Ballast of crushed rock 6 inches in thickness was fairly standard for urban railways constructed in other cities (Richey 1924:34–35).

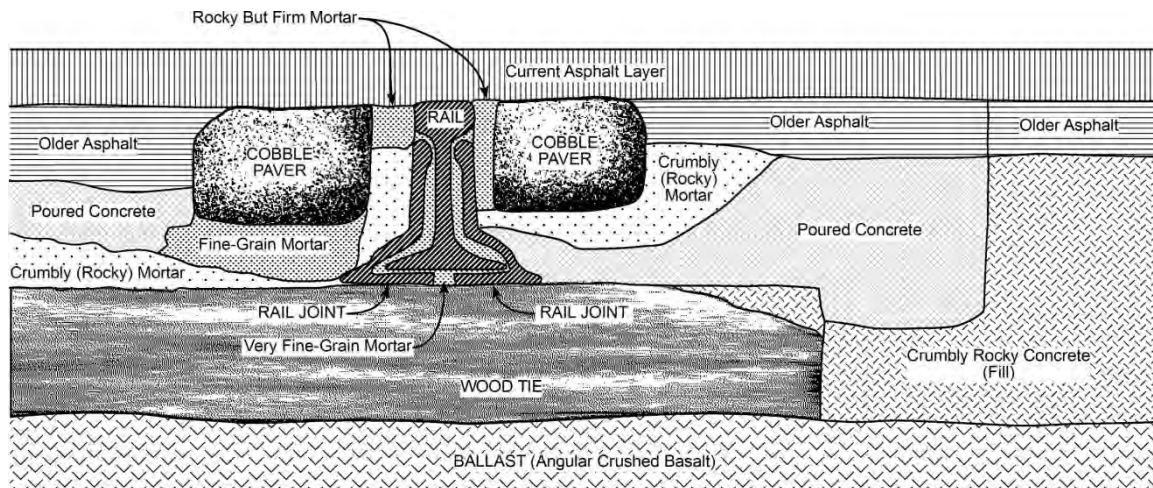


Figure 15. Profile of stratigraphy around the east rail of the Eugene Street Railway College Crest Line on Willamette Street at 19th Avenue. A continuous rail joint, on which the lower flange on both bars wraps under the rail base, is shown here

In many major U.S. cities, a combination of crushed stone and concrete pavement was used as track ballast (e.g., Birmingham, Buffalo, Chicago, Columbus, Kansas City, New Orleans, Omaha, St. Louis). In Omaha, the ballast was 6-inch crushed stone with concrete slab where necessary, while in St. Louis it was solid concrete in paved streets, or stone in unpaved streets (Richey 1924:35). In other cities, concrete pavement or slabs under ties were the only types of ballast listed (e.g., Cincinnati, Cleveland, Detroit, Portland) (Richey 1924:34–35). According to Richey (1924:666), the Bureau of Standards suggested that “solid concrete ballast should be abandoned, and clean crushed stone should be used as a foundation under ties...as it gives greater resiliency to the track and is cheaper than the full concrete ballast.”

The concrete pavement in evidence on the Willamette Street section is situated well above the angular crushed gravel base underlying the railroad ties and thus appears to have been poured in association with later reconstruction/repair of the track. The concrete bordering the cobble pavers contained large rounded pebbles, a common characteristic of concrete poured in Eugene in the early years of the twentieth century.

COBBLE PAVEMENT

The block pavers lining the rail are of hand-hewn basalt that are thought to be from a local outcrop, and were most likely obtained from a basalt quarry on the west side of Skinner Butte in Eugene that operated from the 1890s through the 1930s. Because they are hand-hewn, the pavers vary considerably in size and weight (Table 2). They were bonded together by fine-grain mortar. The pavers were underlain and bounded by poured concrete.

Table 2. Variation in Size and Weight of Cobble Pavers Used in the Willamette Street Section of the Eugene Street Railway College Crest Line.

Specimen No.	Length (inches)	Width (inches)	Thickness (inches)	Weight
1	8¼–8½	4½	4¼–4½	16 lb. 5 oz.
2	8½–8¾	5	3½–4½	17 lb. 3 oz.
3	7	5½	3–4	11 lb. 14 oz.
4	7½	4–4¾	3½–3¾	11 lb. 1 oz.
5	6	4½–4¾	3½–4	7 lb. 15 oz.
6	8–8¾	4½–4¾	3½–4	12 lb. 14 oz.
7	7¾–8¾	5–5½	3½–3¾	14 lb. 5 oz.
8	6½–6¾	4¼–4¾	4–4¼	11 lb. 5 oz.
9	6–6½	5¼–5¾	3½–4¼	13 lb. 2 oz.

The presence of removable block pavers allowed relatively easy access to the rail, facilitating the repair of track-bonding wires attached to the rail and, if necessary, complete replacement of the rail. The installation of pavement was “necessary in order to prevent the infiltration of surface waters which eventually causes disintegration of all forms of foundation” (Richey 1924:31). The block pavers helped prevent street dirt from working its way into the underlying ballast and impairing its function as insulating material. They also helped keep the wood ties dry (Richey 1924:666). Block pavers similar to those observed in the Willamette Street section are shown in a historic photograph of an electric streetcar operated in Eugene by the Portland, Eugene & Eastern Company (Figure 16).

CROSS TIES

The ties used in electric railways commonly measured “6 in. × 8 in. × 8 ft., while 7 in. × 9 in. or 7 in. × 8 in. × 8 ft. to 8 ft. 6 in. long are sizes being used more and more by steam roads” (Richey 1924:28). Richey added, “treatment of ties for wood preservation is without doubt an economical measure for increasing life and thus reducing maintenance charges, inasmuch as the labor cost is now so great a proportion of the total cost of tie renewal” (Richey 1924:28).

The ties observed along the Willamette Street section were of untreated wood. Because the two rails were removed at different times, the length of the ties was not directly measured in the field. Extrapolating from the single rail and tie fragments exposed along east side of Willamette Street, the length of the ties is projected to have been 8 feet. Measurements of nine ties taken in the field found that they varied from 8¼ to 8¾ inches wide, and 5¾ to 6¼ inches thick. Altogether, these measurements suggest that the sawyers were probably aiming for ties measuring approximately 8 feet long, 8 inches wide, and 6 inches thick.



Figure 16. Cobble pavers flanking the rails are visible in this photograph of an electric streetcar operated in Eugene (*Image GN4124, courtesy of the Lane County Historical Museum*).

RAIL SELECTION

In comparison with steam locomotives, electric locomotives or electric motor cars had lower average wheel loads and better distribution of weight (Richey 1924:31). According to Richey (1924:37), “For use where the type of pavement will permit, as with macadam or other shallow pavements in wide streets having moderate vehicular traffic, three standard rails are recommended. These...weigh 80, 90 and 100 lb. per yard, respectively.”

Employing the same categories for describing standard T rails used by Richey (1924:39), measurements were recorded for seven rail segments recovered from Willamette Street. These measurements were then compared to those for standard T rails listed by the American Electric Railway Engineering Association (AEREA) (Table 3).

The Willamette Street rails reflect a considerable range of variation from the measurements for standard T rails in the 80, 90, and 100 pounds-per-yard weight classes. These differences can be summarized as follows:

1. The Willamette Street rails tend to be larger than the AERE 80-lb. rails in terms of height of rail, width of base, and height of web, but smaller in terms of thickness of web, depth of head, and height of flange.
2. The Willamette Street rails are generally the same size, or relatively close in size, to the AERE 90-lb. rails in terms of most categories, but they are consistently larger in height of web and smaller in height of flange.
3. The Willamette Street rails are consistently smaller than the AERE 100-lb. rails across most categories, but they are the same or close in size in terms of thickness of web and height of web.

In general, the measurements from the Willamette Street rails are most consistent with those from the AERE 90-lb. rails. With the height of rail less than 6 inches, the Willamette Street rails are consistent with Richey's (1924:40) comment that "there is an increasing tendency toward the use of standard section (low-T) rails weighing 100 lb. per yard and of a depth of about 6 in." Richey (1924:41) added: "Incidentally the 6 in.-100 lb. low T-rail will permit the use of many types of pavement which are suitable for moderate traffic."

Table 3. Rail Measurements (in inches) Provided by the American Electric Railway Engineering Association (AERE) and Measurements for Rails from the Willamette Street Section of the Eugene Street Railway College Crest Line.

Rail	Height of Rail	Width of Base	Width of Head	Thickness of Web	Depth of Head	Height of Web	Height of Flange
AERE 80	5	5	2½	³⁵ / ₆₄	1½	2 ⁵ / ₈	⁷ / ₈
AERE 90	5 ⁵ / ₈	5½	2 ⁹ / ₁₆	⁹ / ₁₆	1 ¹⁵ / ₃₂	3 ⁵ / ₃₂	1
AERE 100	6	5½	2¾	⁹ / ₁₆	1 ⁹ / ₁₆	3¾	1 ¹ / ₁₆
Specimen D	5½	5½	2½	9 ⁹ / ₁₆	1 ⁵ / ₁₆	3 ⁵ / ₁₆	⁷ / ₈
Specimen E	5 ¹⁵ / ₁₆	4 ¹⁵ / ₁₆	2¼	³ / ₈	1¾	3 ¹³ / ₁₆	³ / ₄
Specimen G	5 ⁹ / ₁₆	5½	2 ⁹ / ₁₆	⁹ / ₁₆	1¾	3¾	¹³ / ₁₆
Specimen I	5 ¹⁷ / ₃₂	5½	2 ⁹ / ₁₆	⁹ / ₁₆	1¾	3 ¹³ / ₃₂	³ / ₄
Specimen J	5 ⁹ / ₁₆	5½	2½	⁹ / ₁₆	1¾	3 ⁷ / ₁₆	³ / ₄
Specimen K short	5 ¹⁷ / ₃₂	5 ¹ / ₁₆	2½	⁹ / ₁₆	1¾	3 ⁷ / ₃₂	¹⁵ / ₁₆
Specimen K tall	5 ⁷ / ₈	4 ²⁷ / ₃₂	2¼	³ / ₈	1 ⁵ / ₁₆	3 ⁹ / ₁₆	³ / ₄

Note: AERE data from Richey (1924:39).

RAIL JOINTS

Rails joints, also known as joint bars, splice bars, or fishplates, are metal bars that are bolted to the ends of two rails to join them together in a track. They come into contact with the rail along the web or fishing surface under the rail head. By tightening track bolts, the joints are wedged in against the sides of the rail so that shear and bending stress due to wheel loads will be transmitted across the joint, giving the effect of a continuous rail (Richey 1924:46).

Early rail joints were simply made from flat pieces of metal, but improved methods of joining rails were later developed:

Around the 1890s this type of rail joint [flat pieces of metal] was modified to have a projection that fit against the underside of the rail “head” and so was named an “angle bar.” Later a heavier type of joint came into use that fit completely around half of the rail, on the underside of the base and also the web, and with two of these, one on each side of the rail, it formed a “continuous” joint and was so-called [Farrar 2005].

Both types of rail joints—the angle bar splice and the continuous splice—were observed on the Willamette Street section (a continuous splice joint is shown in Figure 15).

Richey (1924:48) notes that the length of rail joints varied “from about 2 ft. with 4 bolts to 3 ft. with 6 bolts, although a length of 3½ ft. has been used.” He added that “the short bar is used with a suspended joint midway between two ties, the bar reaching from tie to tie. The long bar is used with a three-tie joint, the ends resting on the outer ties with the joint on the center one” (Richey 1924:48).

One rail specimen (Specimen L) recovered from the Willamette Street section reflects use of continuous rail joints made by the same manufacturer, but in different years, to join rails made seven to eight years later by another manufacturer. These continuous rail joints are 26¾ inches long and 4¾ inches high (Figure 17). They are connected by four bolts with a total length (head plus shank) of 5¼ inches, ⅜-inch washers, and nuts 1½ inches square. The joints were made by the Illinois Steel Company. One bears the date 1912 and the other bears the date 1913. These rail joints connect rails made by the Colorado Fuel & Iron Company in 1920.

A third type of rail joint, known as a compromise joint, was also observed in the Willamette Street section (American Railway Engineering and Maintenance-of-Way Association 2003:79–80). This type of joint was used to connect rails of different sizes with markedly different profiles (Figure 18). This compromise joint was used to join a rail made by Lorain Steel in 1912 and a rail from Inland Steel made in 1913. This rail joint measures 27¼ inches long, 4¼ inches high, and 1⅝ inch thick. Five steel bolts were fastened through holes in the joint bar, with three bolts on the taller rail (Specimen K tall) and two bolts on the shorter rail (Specimen K short). The steel bolts are ¾ inch thick and



Figure 17. Views of the two halves of a continuous rail joint (made in 1912 and 1913) from the Illinois Steel Company. This joint connected rails made by the Colorado Fuel & Iron Company in 1920.

have a total length (head plus shank) of $4\frac{3}{4}$ inch. The nuts measure $1\frac{1}{2}$ inches square. A $\frac{1}{2}$ -inch-thick braided copper track bonding wire extends for $36\frac{1}{4}$ inches along one side of the joined rails (Figure 19).

TRACK BONDING

Track bonding refers to “the application of [an] electrical conductor to maintain good conductivity from rail to rail at the joints of the track circuit” (Richey 1924:645). In the section of the urban railway exposed on Willamette Street, bonds were occasionally observed in the form of stranded copper wire or copper strips tucked under the rail head (Figure 20).

An unusual example of a bond observed during this project is the $\frac{1}{2}$ -inch-thick stranded wire extending along the outside of the compromise joint shown in Figure 19. Richey (1924:648) noted that “long bonds for spanning splice bars on small rails should be about 5 in. longer (formed) than the splice bar, and about 6 in. longer than the splice bar on large rails.” At $36\frac{1}{4}$ inches long, the bond extending along the compromise joint is 9 inches longer than the splice bar, a length highly consistent with the standards given in Richey’s *Electric Railway Handbook*.

TIE PLATE

A tie plate (also known as a baseplate) is a steel plate placed between the flanges on a T rail and the cross tie. Tie plates increase bearing area and hold the rails to correct gauge. They are fastened to wooden ties by means of spikes through holes in the plate.



Figure 18. Cross sections of rails from Lorain Steel Company (left, Specimen K tall) and Inland Steel Company (right, Specimen K short) shown in Figure 19.



Figure 19. Side view of compromise joint connecting rail from Lorain Steel Company made in 1912 (Specimen K tall) on left and rail from Inland Steel Company made in 1913 (Specimen K short) on right. Bond of stranded wire extending along the rail web is $\frac{1}{2}$ inch thick and $36\frac{1}{4}$ inches long.



Figure 20. Examples of track bonding observed on rails include copper wire (left) and copper strips (right).



Figure 21. Single-shoulder tie plate used on the Eugene Street Railway.

The top surface of the plate has one or two shoulders that fit against the edges of the base of the rail. The single-shoulder type was earlier and was adaptable for various rail widths; the double-shoulder type is used today. Tie plates came into use around 1900, before which time flanged T rail was spiked directly to the ties. The use of tie plates on electric railways varied from city to city, and they were not used on electric railways in many cities, including Portland, Oregon (Richey 1924:32–33).

Tie plates were observed only in the vicinity of the intersection of Grand View Drive and Willamette Street. The one collected example of a tie plate measures 8 inches square and $\frac{3}{8}$ inch thick. It is of the single-shoulder type, with four $\frac{3}{4}$ -inch square holes through which spikes were driven to attach it to a tie (Figure 21). When collected, one $5\frac{3}{4}$ -inch spike was still attached. Along most of the Willamette Street section, tie plates were not present, and rails were spiked directly to the ties (Figure 22).



Figure 22. Along most of the Willamette Street section, tie plates were absent and spikes were nailed directly against the rail.

TRACK SPIKES

In view of the intact condition of the urban railway track uncovered along this section, it is not surprising that large numbers of track spikes were observed among the railroad remains. Among the small sample measured, $5\frac{3}{4}$ -inch spikes (with some variation in shank thickness) were by far the most common. Individual examples of spikes measuring $5\frac{1}{2}$, 5, $4\frac{1}{4}$, and 4 inches were also observed (Figure 23).



Figure 23. Selection of spikes of different sizes represented on the Willamette Street section of the Eugene Street Railway. Shown here (left to right) are spikes measuring $5\frac{3}{4}$, $5\frac{1}{2}$, 5, $4\frac{1}{4}$, and 4 inches in length.

5. RAIL MANUFACTURER'S BRANDS

The 12 bent rail segments transported to the private warehouse were prepared for examination of manufacturer's brands by chipping off the most easily removed patches of adhering concrete and by brushing the surfaces to clean rust from the webs where brands might be present. The segments were then spread out on the warehouse floor where they were assigned a letter designation (Specimens A through L) and carefully inspected (Figure 24).

Letters and numbers from partial brands were identified on all 12 rail segments (Table 4). The sample of rails includes segments bearing dates of 1911, 1912, 1913, and 1920. Rails with dates of 1911 ($n = 3$), 1912 ($n = 2$), and 1913 ($n = 3$) were obtained from three manufacturers. The rails with the date 1920 ($n = 3$) were obtained from a single manufacturer. In keeping with slight differences in their measurements (see Table 2), the rails from the different manufacturers vary somewhat in profile (Figure 25). As previously indicated, collected specimens most closely correspond to 90-lb. rails. Although the rail weight does not appear to be indicated in brands on the earlier rails, the **90ARA** in the brands on the 1920 rails support this conclusion.

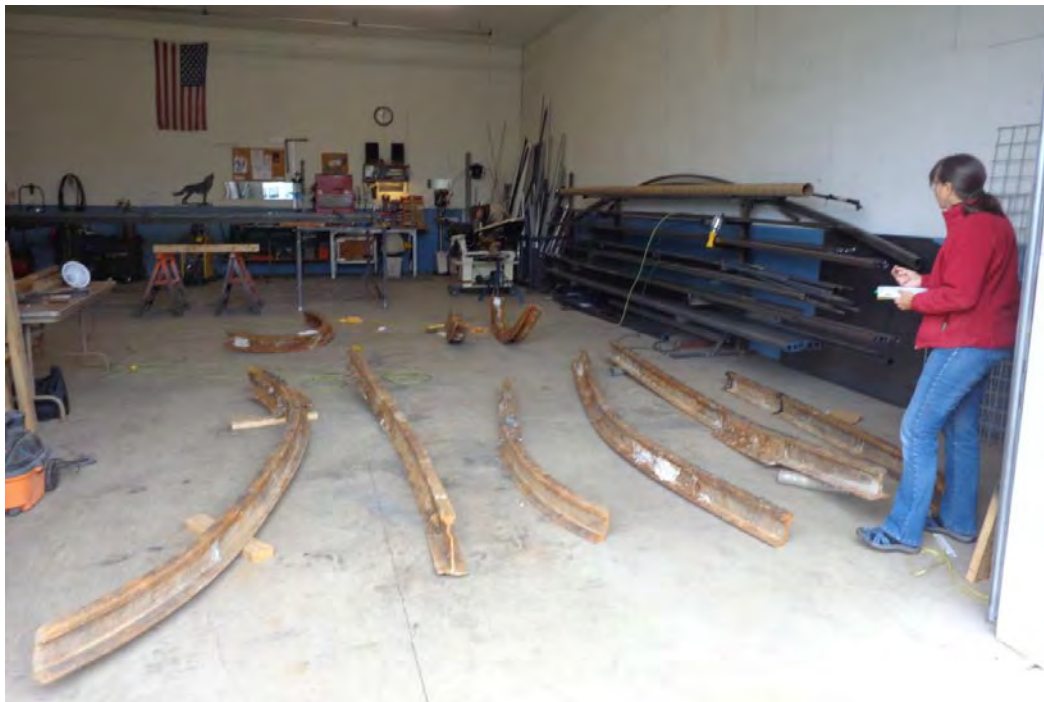


Figure 24. Rail segments in the warehouse undergoing examination for manufacturers' brands.

Table 4. Manufacturer's Brands Identified from the College Crest Line in Willamette Street.

Date	Specimen	Observed Brand	Manufacturer
1911	C	ARA 90[?]0 ILLINOIS STEEL Co SOUTH WKS VIII 1911	Illinois Steel Co.
1911	F	VIII 1911	Illinois Steel Co.
1911	G	Side 1: ARA 9020 ILLINOIS STEEL Co SOUTH ... Side 2: SOUTH WKS VIII 1911	Illinois Steel Co.
1911	H	ARA 9020 ILLINOIS STEEL Co SOUTH WKS VIII 1911	Illinois Steel Co.
1912	E	LORAIN STEEL CO. 1912 ... IIIIIIIII	Lorain Steel Co.
1912	K	AR [?] ... E 1912	Lorain Steel Co.
1913	B	...A OH 9020 I S OO	Inland Steel Co.
1913	I	1913 ... ARA [obscured by concrete] 9020 [?] CO GARY IIIIII 1913 ... ARA OH 9020 I S Co	Inland Steel Co.
1913	J	ARA O H 9020 I S CO GARY IIIIIII 1913	Inland Steel Co.
1920	A	90ARA [?] VI 1920 OH	Colorado Fuel & Iron Co.
1920	D	...1920 OH [obscured by concrete] COLORADO SEC 90ARA VI 1920 OH	Colorado Fuel & Iron Co.
1920	L	COLORADO SEC 90ARA VI 1920 OH	Colorado Fuel & Iron Co.

ARA = American Railway Association, an industry trade group (1892–1934)

OH = Open Hearth Steel

Roman numerals indicate month of manufacture (e.g., **VIII** = August)

Hatch marks indicate month of manufacture (e.g., **IIIIII** indicates the rail was rolled in the 6th month)

ILLINOIS STEEL COMPANY

The three rails with 1911 dates (Specimens C, G, and H) are from the Illinois Steel Company South Works plant. Illinois Steel was formed in 1889 by a merger of the North Chicago Rolling Mill Company, the Joliet Company, and the Union Iron and Steel Company (Illinois State Archives 2013). In 1901, Illinois Steel became part of U.S. Steel, J. P. Morgan's giant national corporation. That same year, U.S. Steel South Works, the largest steel works in Illinois, was incorporated, and by 1910 employed about 11,000 people. U.S. Steel built a huge new mill on the south shore of Lake Michigan in 1906, and by the 1920s the Gary Works was the largest steel plant in the country. South Works continued in operation through the decline of the U.S. steel industry in the 1970s and 1980s before finally closing its doors in 1992 (Bensman and Wilson 2005).



**Illinois Steel Company 1911
(Specimen G)**



**Lorain Steel Company 1912
(Specimen E)**



**Inland Steel Company 1913
(Specimen I)**



**Colorado Fuel & Iron Company 1920
(Specimen D)**

Figure 25. Profiles of rails from manufacturers identified on the Willamette Street section of the College Crest Line.

LORAIN STEEL COMPANY

One of the two rails with a 1912 date (Specimen E) bears the brand of the Lorain Steel Company of Lorain, Ohio. Although little of the manufacturer's brand is present, the second rail with a 1912 date (Specimen K tall) presumably also was made by Lorain Steel. The Lorain facility, located along the Black River near Lake Erie in northwest Ohio, was founded in 1895 when the Johnson Steel Street Rail Company moved its rail mill from Johnstown, Pennsylvania, to Lorain. On November 1, 1898, the Johnson Company reorganized and changed its name to the Lorain Steel Company. On April 1, 1901, the Lorain Steel Company became a subsidiary of the United States Steel Corporation. By 1903, the Lorain Steel Company had 2,300 employees (Lorain Public Library 2013). The plant later operated under the names National Tube Company of U.S. Steel and Lorain Cuyahoga Works of U.S. Steel before becoming USS/KOBE in 1989 (Republic Steel 2013). A rail bearing the brand "**LORAIN STEEL CO. 1916**" was identified among the historic urban railway remains in Astoria (Ragsdale 2011:9, 13).

INLAND STEEL COMPANY

The two rails with 1913 dates (Specimens I and J) are from the Inland Steel Company, based on the lettering **I S CO GARY** on Specimen J (and probably also represented in partial lettering on Specimen B). After incorporating in 1893 and purchasing the idle machinery of the Chicago Steel Works, Inland Steel began production in 1894. In 1897, the company purchased the East Chicago Iron and Forge Company, renamed it Inland Iron and Forge, and began producing equipment for the railroad industry. Construction in 1902 of a new, large, open-hearth steel mill at Indiana Harbor (in East Chicago, Indiana, 27 miles southeast of downtown Chicago), significantly increased the company's production capacity. After World War I, the railroad industry replaced agriculture as Inland's top customer. In the 1920s, Inland began making steel rails, an innovation in the steel industry. In 1998, the Inland Steel Company was purchased by Ispat International, and subsequently became known as Ispat Inland, Inc. (Northwest Indiana Steel Heritage Project 2009).

COLORADO FUEL AND IRON COMPANY

Two of the three rails with the 1920 dates (Specimens D and L) bear the brand **COLORADO**, which presumably indicates manufacture by the Colorado Fuel and Iron Company of Pueblo, Colorado. Based on its 1920 date, a third rail (Specimen A) is presumably also from this manufacturer. From a merger of the Colorado Coal and Iron Company (CC&I) and Colorado Fuel Company, the Colorado Fuel and Iron Company (CF&I) was formed in 1892. In 1903, CF&I was acquired by the Rockefeller family and Gould interests. By 1906, as much as 10 percent of Colorado's population was employed by the company. With its principal and largest plant located in Pueblo, Colorado, the company manufactured iron, steel, and other steel products, including wire, rails and rail

fastenings, steel, carbon steel plates, wire rope, and many other metal products Lehman Brothers Collection 2012).

On September 23, 1913, 9,000 coal miners went on strike against the CF&I, protesting low wages, dangerous working conditions, and the company's domination over their lives. The strike went on through the winter of 1913–1914, with the mines not able to operate. The governor of Colorado brought in the National Guard, and on April 20, 1914, the soldiers fired into the miner's tent colony at Ludlow, Colorado, setting the camp ablaze. After the smoke cleared, 18 of the camp's inhabitants were dead, including two women and ten children. The so-called Ludlow Massacre was important in swinging public opinion against mining companies, and led to establishment of a union that improved the living conditions of the miners. This union later served as a model for organizing workers in other businesses (Larkin and McGuire 2009).

CF&I continued in operation and, after going through several bankruptcies, was acquired by Oregon Steel Mills in 1993, and changed its name to Rocky Mountain Steel Mills. In 2007, along with the rest of Oregon Steel's holdings, it was acquired by a Russian steel corporation (Lehman Brothers Collection 2012).

6. CONCLUSIONS AND RECOMMENDATIONS

As part of the historic Eugene Street Railway buried below the surface under modern pavement, the 640-foot-long section uncovered in Willamette Street between 19th and Grand View Drive is more than 75 years old and is considered an archaeological resource protected under Oregon State law. It has been recorded with the Oregon State Historic Preservation Office as historical archaeological site 35LA1590. Removal of this archaeological resource required a State of Oregon archaeological permit. Compliance with the conditions of this permit set in motion the process through which new information was recovered about this historic urban railway—information that otherwise would have been lost.

NEW INFORMATION ABOUT EUGENE’S URBAN RAILWAY

The section of historic urban railway uncovered in Willamette Street during the City of Eugene’s repaving project between 19th and 23rd avenues in 2013 is from the electric-powered streetcar or trolley system in operation from September 26, 1907, to October 17, 1927. This system operated under the names (1) Eugene & Eastern Railway Company, (2) Portland, Eugene & Eastern Company, and (3) Eugene Street Railway. The latter name was applied to the system by the Southern Pacific Railroad, which took it over on July 1, 1915, and thus operated the urban railway for the longest period, over 12 years.

The Willamette Street section was part of the College Crest Line, one of the four main routes operated by the Eugene Street Railway. A special edition of the *Eugene Daily Guard* indicates that service on this line began on July 31, 1910. The College Crest Line was built during the period when the Portland, Eugene & Eastern Company operated the urban railway system, and was operated by that company until it was bought out by Southern Pacific on July 1, 1915.

The College Crest Line was in operation less than two years when the June 18, 1912, edition of the *Eugene Daily Guard* noted that plans were underway to reconstruct the College Crest and Fairmount Lines “in order to use large, comfortable cars on all parts of the system....” A later story in the January 2, 1913, edition of the *Eugene Daily Guard* reported that “The Portland, Eugene & Eastern Company will shortly commence the laying of the heavy steel they have on hand for street railway work on South Willamette street.”

These newspaper accounts suggest that the initial construction of the urban railway track in 1907 by the Portland, Eugene & Eastern Company used lighter weight rails that were not up to the task of supporting urban streetcars. The rails recovered in the Willamette

Street section in 2013 that bear dates of 1911, 1912, and 1913 correspond with AEREA 90-lb. rails and apparently were laid during early repair or reconstruction of the College Crest Line. The fact that rails with these dates were obtained from three different manufacturers (Illinois Steel Company, Lorain Steel Company, Inland Steel Company) suggests that the Portland, Eugene & Eastern was scrambling for rails to use in this reconstruction.

The College Crest Line later underwent further reconstruction or repair, as indicated by the recovery of Colorado Fuel & Iron Company rails with dates of 1920 in the Willamette Street section. This reconstruction occurred during the 12-year-span when the urban railway was operated by Southern Pacific. Although not all segments were carefully examined, no evidence of any further reconstruction was found, suggesting that the rails made in 1920 that were installed along this section continued in use until the Eugene Street Railway closed down on October 17, 1927.

When Southern Pacific opted to discontinue operation of the urban railway in favor of motorized busses in 1927, the company acted quickly to dismantle the system. The tracks in the city streets were at least a mild impediment to motor vehicles, and with the railway no longer in operation, the overhanging electrical wires were no longer needed. In removing the rails and electrical wires, Southern Pacific made the decision to do away with the urban streetcars irreversible. Probably because of the expense, however, not all of the tracks were removed, and in some areas they were simply covered over by pavement. It was one of these sections—left intact and covered by asphalt—that was uncovered in Willamette Street in 2013.

SIGNIFICANCE EVALUATION

Archaeologists began monitoring the City's repaving project only after work shifted to the east side of Willamette Street. Despite this limited involvement, the archaeological investigations were successful in documenting previously unknown details of urban railway construction and, in conjunction with archival research, securing the information necessary to assess the historical significance of this section of the Eugene Street Railway.

The significance of archaeological and historical resources is generally assessed in terms of the criteria for eligibility to the National Register of Historic Places (NRHP) as provided in 36 CFR 60.4:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

- (b) that are associated with the lives of persons significant in our past; or
- (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- (d) that have yielded, or may be likely to yield, information important in prehistory or history.

The remains of the Eugene Street Railway uncovered in 2013 are considered significant in terms of eligibility to the National Register under criterion A, as a historical resource that made a significant contribution to the broader patterns of history in the City of Eugene. The years of the electric-powered urban railway's operation, from 1907 to 1927, coincided with a period of significant growth in the city. At a time before automobiles, the urban railway allowed people to live at increasing distances from the downtown core. In Eugene, the operation of the urban railway led to development of the College Crest and Fairmount neighborhoods. A similar evaluation of significance in terms of National Register criterion A was made in a study of streetcar tracks from a system operated by the Salem Light, Power and Traction Company from 1889 to 1927 (Perrin et al. 2012:23–24).

A major conclusion of the present study is that the remains of the Eugene Street Railway uncovered in 2013 are also significant in terms of eligibility to the National Register under criterion D, as their study has yielded important information about the history of the industrial technology used in its construction. The present study is distinguished by an archaeological approach to documentation of the railway remains through active monitoring and recording during removal of the east rail and track and by recovery of rail segments and other track components for identification and analysis. The resulting synthesis of information has provided the first in-depth look at the manner in which an urban railway was constructed and maintained over time in a city in Oregon.

Previous studies of urban railway remains in Oregon have been limited to measurements and photographs of exposed rails. These studies have suggested that the significance of historic railway remains may be diminished by alterations in integrity of design, materials, and workmanship. Such standards are often applied by historic preservationists in evaluating historic buildings, where alterations may be used to justify evaluation of structures as no longer significant from an architectural point of view. This approach does not appear applicable in evaluating the significance of industrial resources where parts wear out and are replaced or new parts are introduced to improve efficiency.

This point is well illustrated in the findings of the present study that demonstrate the extent to which the urban railway underwent replacement of rails and other track components over time. Shortly after the 1910 opening of the College Crest Line, the original rails were replaced by heavier rails made in 1911, 1912, and 1913, and apparently some of these were later replaced by rails made in 1920. These replacements

reflect upgrading of the track system as part of maintenance of a working streetcar line. It is highly unlikely that a pristine section of a historic urban railway, one that has not undergone “alterations,” will ever be found. As with any functioning mechanical system, these urban railways were working railroads that were regularly maintained and modified during the course of their operations.

RECOMMENDATIONS

When operation of the urban railway in Eugene was discontinued by Southern Pacific in 1927, the company apparently pulled up the rails (and presumably the supporting track components) along much, if not most, of its lines. In subsequent years, additional sections of track have been removed during street construction projects in Eugene, including sections along Alder Street and 13th Avenue near the University of Oregon during a repaving project as recently as 2012. Other sections of the historic urban railway are known to still exist, notably under Columbia, University, and Moss streets in southeast Eugene.

As demonstrated in this study, the remains of the historic urban railway in Eugene are a significant archaeological resource according to the criteria for eligibility to the National Register of Historic Places. Accordingly, the primary recommendation of this study is that remaining sections of the historic railway should be left in place. Where prudent and feasible, impacts to these historic streetcar remains should be avoided during future street construction projects.

In the event that impacts to remaining sections cannot be avoided, consultation with SHPO will be required to define documentation and mitigation that may be needed. Archaeological investigations similar to those undertaken in this study, involving close monitoring by archaeologists as the track is exposed and removed, may be required to document the historic railway remains. The results of the present study, which are based on railway remains found in an area only about two blocks in length, clearly demonstrate that a considerable amount of information about the historic urban railway can be recovered even in a very limited investigation.

Components of the historic urban railway, notably rails and cobble pavers, should be viewed as significant artifacts of the past by the City of Eugene. Beyond their monetary value to railroad artifact collectors or metal recyclers, these historical materials are suitable for use in interpretive projects and public works (e.g., garden landscaping). For example, at the conclusion of the present repaving project, the City of Eugene used two rail segments, along with cobble pavers that flanked the rails, in an interpretive reconstruction of the historic urban railway line at the intersection of 20th Avenue and Willamette Street (Figure 26). In addition, four short rail segments were donated by the City of Eugene to the Oregon Department of Transportation for future use in an interpretive exhibit on historic urban railways in Salem. Rails and other components from historic railways are also valuable additions to collections curated at historical museums.



Figure 26. Rails and cobble pavers were used to commemorate Eugene's historic streetcar system at the intersection of 20th Avenue and Willamette Street (upper view to north, lower view to southwest).

From a management standpoint, there is at present no definitive source of information on where tracks from the mule-drawn and electric-powered railways remain and where they may be encountered during future City of Eugene street construction projects. The present study of a section of urban railway track uncovered in Willamette Street has provided some contextual information on the College Crest Line, but further research is needed. To construct a comprehensive account of the historic urban railway system, four main avenues for future research are suggested:

- A systematic review of stories and advertisements pertaining to the historic streetcar system that appeared in Eugene's early newspapers beginning sometime before the mule-drawn streetcar line went into operation in 1891 and continuing until the demise of the electric-powered railway in 1927;
- A review of city maps, including but not limited to those made by the Sanborn Map Company, to document the locations of the various urban railway lines and associated facilities and identify any changes in the routes over time;
- A systematic review of historic photograph collections for images pertaining to the historic streetcar system beyond those on file with the Lane County Historical Society, including photographs in the Oregon Collection at the University of Oregon, at the Springfield Museum, and in private collections, such as those mentioned by Hulin (1973) (the B. H. Ward, Vernon Seppers, and Jim Summers collections); and
- An examination of city records from roadway projects where rail segments have been encountered and either removed or left in place.

In view of the fact that additional sections of the historic urban railway are likely to be encountered and need to be removed during street construction in the future, preparation of a comprehensive historic review in conjunction with a treatment plan is recommended. The treatment plan would identify potential areas of concern where remains of the urban railway are most likely to be encountered. It would outline options for treatment of the railway remains, which might include avoidance, exposing or enhancing the rails, mimicking or replicating the rails on pavement, and using the rails in various interpretive venues. Measures to involve neighborhood groups and others interested in local history may be recommended as a means of obtaining a range of ideas to promote interpretation and awareness of this aspect of Eugene's history.

A treatment plan could also serve as an important resource publicizing the City's responsibility for safeguarding historical resources among City employees involved in street construction. It is important to preserve "institutional memory" about the existence and significance of the historic streetcar remains.

In addition, a Programmatic Memorandum of Agreement (PMOA) between the City and SHPO, based on the context statement and treatment plan, would provide guidance to the City of Eugene in the future management of these historical archaeological resources. In this manner, it may be possible to avoid costly delays, as well as minimize impacts to the remaining sections of the historic streetcar system, during future street construction projects in the City of Eugene.

REFERENCES CITED

- American Railway Engineering and Maintenance-of-Way Association
 2003 *Practical Guide to Railway Engineering*. American Railway Engineering and Maintenance-of-Way Association, Lanham, Maryland.
- Bensman, David, and Mark R. Wilson
 2013 Iron and Steel. In *Encyclopedia of Chicago*. Electronic document, <http://www.encyclopedia.chicagohistory.org/pages/653.html>, accessed October 1, 2013.
- Cooley, Gabriel
 1996 "Traveling Light: The Eugene Trolley Era." An Oregon Documentary Project. Produced in association with the School of Journalism & Communication, and the Knight Library IMG-ITV, University of Oregon. YouTube video, <http://www.youtube.com/watch?v=dTkdy1peo4>, accessed December 6, 2013.
- Friendly Area Neighbors
 2013 The Eugene and College Hill Street Railway (1891–1900). In *Neighborhood History Topics*. Electronic document, <http://02c9d6e.netsolhost.com/history.html>, accessed December 6, 2013.
- Farrar, Lynn
 2005 Reply to "Question: 'fishplate.'" In Central Pacific Railroad Discussion Group. Electronic document, <http://discussion.cpr.net/2005/08/question-fishplate.html>, accessed February 21, 2014.
- Houghlum, Roger
 1988 Transportation to College Crest in 1918. *Lane County Historian* 33(3):63–66.
- Hulin, Gilbert
 1973 *Eugene's Trolley Car Era*. *Lane County Historian* 18(1):3–15.
- Illinois State Archives
 2013 Document 43 Explanation. In *From the Ashes, 1872–1900: A Selection of Documents from the Illinois State Archives*. Electric document, http://www.cyberdriveillinois.com/departments/archives/teaching_packages/from_the_ashes/doc43.html, accessed December 5, 2013.
- Labbe, John T.
 1980 *Fares, Please! Those Portland Trolley Years*. The Caxton Printers, Caldwell, Idaho.

Larkin, Karin, and Randall H. McGuire

- 2009 *The Archaeology of Class War: The Colorado Coalfield Strike of 1913-1914*. University Press of Colorado, Boulder.

Lehman Brothers Collection

- 2012 Colorado Fuel & Iron Corp. Electronic document, http://www.library.hbs.edu/hc/lehman/company.html?company=colorado_fuel_and_iron_corp, accessed December 6, 2013.

Lorain Public Library

- 2013 History of Lorain, Ohio—Chronology. Electronic document, <http://lorain.lib.oh.us/research/local-research/local-history-resources/history-of-lorain-ohio--chronology#1900>, accessed December 6, 2013

Lowry, Marian

- 1936 Riding the Buses in Gay Nineties! Local Man Recalls Early Days of “Street Transit” System in Eugene. Clipping on file at Lane County Historical Museum from *Eugene Register-Guard*, 3 May:1–2.

Northwest Indiana Steel Heritage Project

- 2009 The Modern History of Inland Steel. Electronic document, <http://www.nwsteelheritagemuseum.org/inland-history.htm>, accessed December 6, 2013.

O’Brien, Mike

- 1973 Man Recalls Eugene’s Trolley Era. *Eugene Register-Guard*, 21 January:11A.

Perrin, Natalie K., Jennifer Olander, and Emily K. Ragsdale

- 2012 *Investigations for Historic-Era Tracks Discovered During the 2012 Downtown Street Resurfacing Project, City of Salem, Marion County, Oregon*. Report of Historical Research Associates to Mason, Bruce & Girard. Portland. On file, Oregon State Historic Preservation Office, Salem (SHPO No. 25360).

Ragsdale, Emily K.

- 2011 *Investigations for Historic Streetcar Tracks Inadvertently Discovered During the Bond Street Waterline Relation Project, Clatsop County, Oregon*. Report of Historical Research Associates to the City of Astoria. Portland. On file, Oregon State Historic Preservation Office, Salem (SHPO No. 24705).

Republic Steel

- 2013 About Us. Electronic document, <http://www.republicengineered.com/about-us>, accessed December 6, 2013.

Richey, Albert S.

- 1924 *Electric Railway Handbook; A Reference Book of Practice Data, Formulas and Tables for the Use of Operations, Engineers, and Students*. 2nd ed. McGraw–Hill Book Company, New York.

Tims, Marvin

- 1957 Intercity Rail Link Begun 50 Years Ago. *Eugene Register–Guard*, 17 March:3C.
- 1964 Clang! Clang! Clang! Went the Trolley. *Eugene Register–Guard, Emerald Empire*, 20 December:3–6.